TECHNICAL ASSUMPTIONS BINDER
(NTAB)

AT&T

MCI

Non-Recurring Cost Model Technical Assumptions Binder (NTAB)
Version 2.2

WORKING DRAFT IN PROGRESS

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1. OVERVIEW

1.1 General

The purpose of the Non-Recurring Cost Model Technical Assumptions Binder (**NTAB**) is to further explain the rationale for assumptions made within the Model.

The *Non-Recurring Cost Model (NRCM)* develops one time (non-recurring) cost estimates for the tasks and activities that may be performed by an Incumbent Local Exchange Carrier (ILEC) when a Competitive Local Exchange Carrier (CLEC) requests wholesale services, interconnection, and/or unbundled network elements.

Utilizing a forward looking cost methodology, the **NRCM** develops a "bottoms-up" estimate of non-recurring costs. A "bottoms-up" cost estimate assembles the real time cost of each activity in a process to arrive at the overall cost of delivering a service. The cost estimates put forward by most ILECs are "top-down", that is, distributing all allowable costs into each service element based on current or past approximations. This is done without consideration for inefficiencies and the need to model forward looking technologies and processes. The **NRCM** reflects the individual OSS tasks and activities that may be required to respond to a CLEC request. To the extent feasible, each component has been separately costed.

The majority of non-recurring element types involve activities associated with the pre-ordering, ordering and /or provisioning process. A short description of these processes follows:

Pre-ordering: The process by which a CLEC interfaces with customers to determine customer needs. A CLEC and ILEC exchange necessary information to initiate orders. This information, such as customer premise address, phone number availability, feature availability and service availability is made accessible to CLECs electronically so they can accurately respond to customers when taking service and feature orders.

Ordering: The process by which a CLEC electronically submits a Local Service Request (LSR) to an ILEC via an electronic gateway. The ILEC responds electronically with a positive confirmation of order acceptance.

Provisioning: The process by which an ILEC, after receipt of an LSR order, performs the necessary functions to provide the service, interconnection, or Unbundled Network Elements (UNE) requested by a CLEC. Provisioning is a coordinated combination of "Steps" involving various provisioning process systems and/or workforce groups. Technicians can be involved in analyzing the Service Orders, connecting elements, testing circuit segments, resolving problems (Fallout), and closing out the orders

These processes are depicted in the high-level chart on the next page.

PRE-ORDERING

Customer Contact & Info Gathering

ORDERING

Local Service Request

CLEC Processes

CLEC Gateway

ILEC Processes

ILEC Gateway

ORDERING

Administrative & Billing Information

Service Order Generation & Processing

Network Database Information

PROVISIONING

Network Elements Configuration Management

Service Order Analysis and Control

Work Force Management

Network Elements

Network Elements Inventory & Assignment
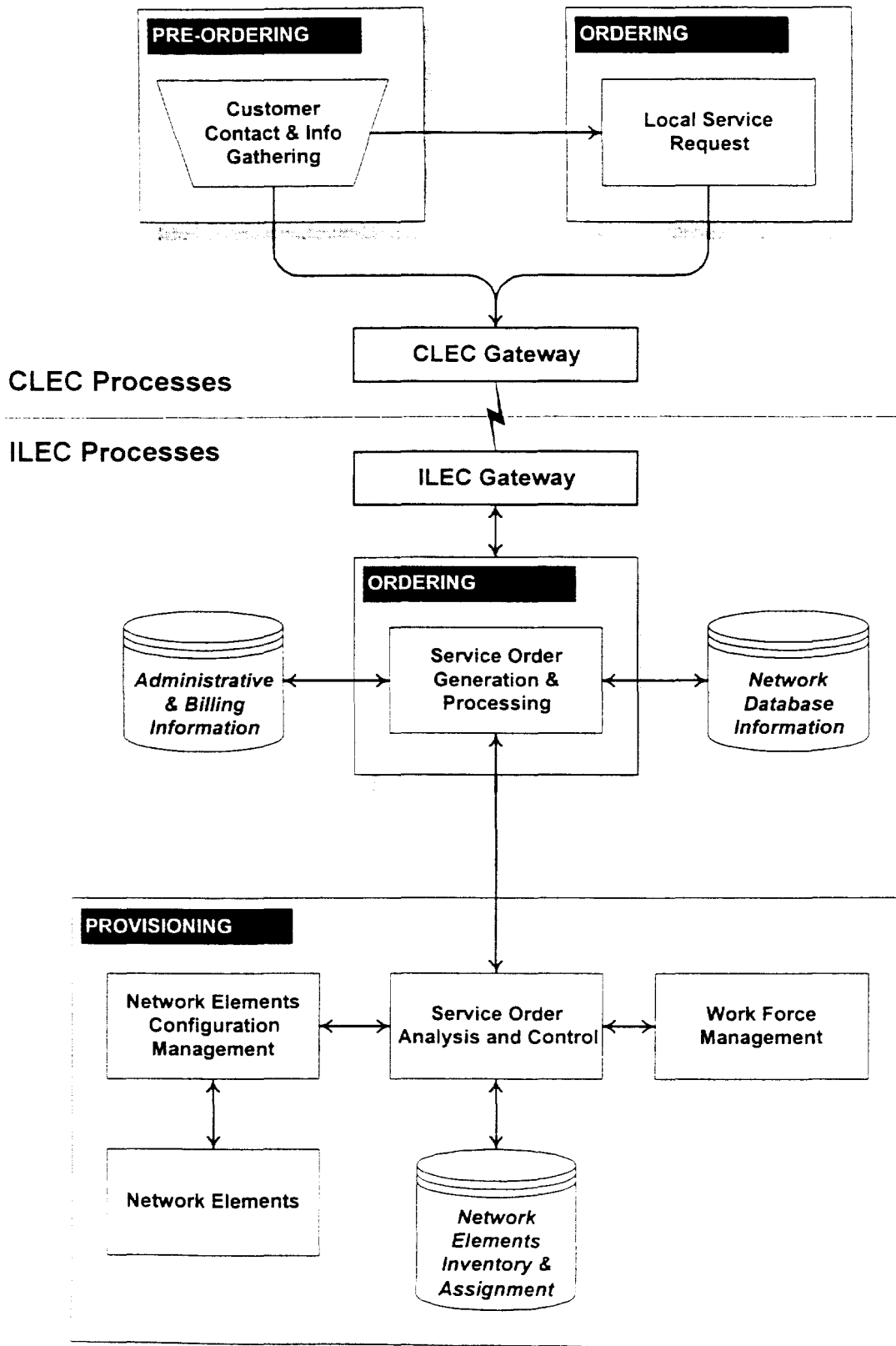
In summary, the **NRCM** provides a detailed step-by-step understanding of the systems required and the manual work activities performed by an ILEC in the ordering and provisioning of wholesale services and unbundled network elements. The model is designed to reflect the most efficient management and operations of existing ILEC OSSs. The **NRCM** also reflects forward looking technology that is available in the market.

The **NTAB** explains and or defines in more detail issues such as technical assumptions based on *subject matter experts' estimates, fallout, labor rates, OSS forward looking architecture, flow through, dedicated facilities* and each of the *element types* to name but a few. Each specific Model input variable is addressed in detail within the **NTAB**.

1.2   NRCM Methodology

As shown by the following chart, the **NRCM** develops costs in four distinct stages:

NRC Model Process
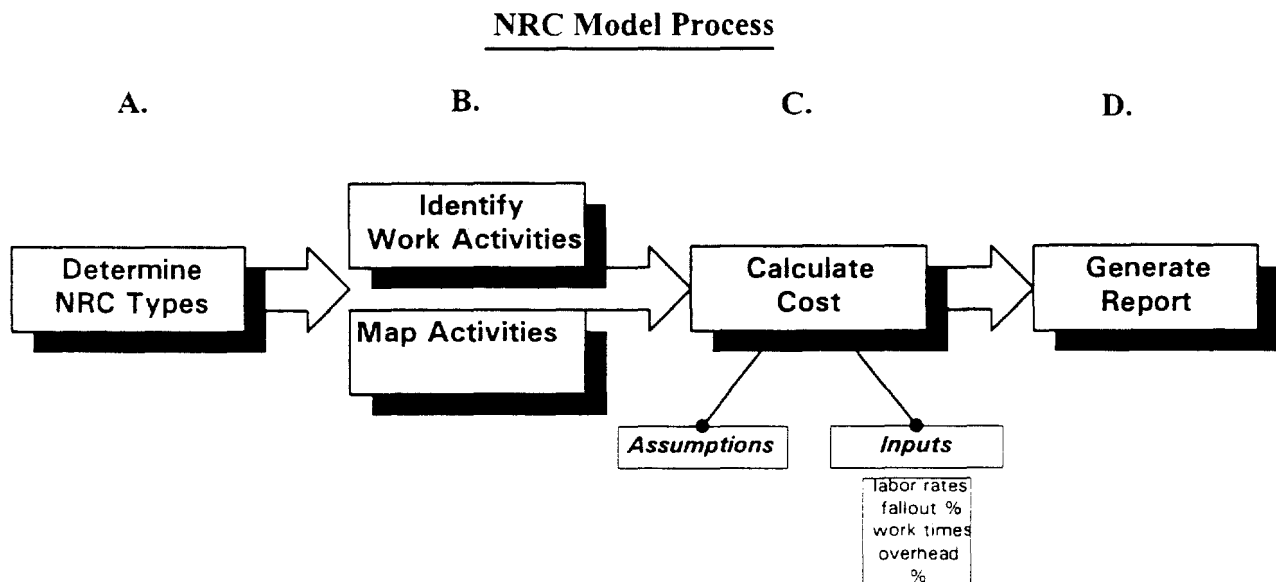
A. Determine Non-Recurring Cost Element Types:

The NRC element types that were initially selected for calculation by the model were developed based on a review of the charges proposed by ILECs during negotiation and arbitration proceedings. These NRC element types consist primarily of functions performed in the provisioning of service to existing customers (**migration**)[1] and to new customers (**installation**)[2].

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[1]   Migration is defined as moving existing ILEC customers to a CLEC.

[2]   Installation is defined as the establishment of service for a CLEC customer that is not currently served by an ILEC. Service may be for an existing or new customer premise.

The following element types have been added to the NRCM (Version 2.2);

- *"DS1 Interoffice Transport Disconnect"*

- *"DS3 Interoffice Transport Disconnect"*

- *"DS3 Loop to Customer Premise Migration"*

- *"DS3 Loop to Customer Premise Install"*

- *"DS3 Loop to Customer Premise Disconnect"*

The *Telecommunication Act of 1996* explicitly allows new entrants to provide local telecommunication services by means of various connectivity options. To the extent these options cause different costs to be incurred, such costs are modeled separately within the NRC Model. The local connectivity options include:

Total Services Resale *(TSR):* ILEC acts as a wholesaler of local telephone service which the CLEC then resells to end user customers.

Unbundled Network Elements Platform *(UNE-P):* CLEC purchases unbundled network elements in combination from the ILEC at cost-based rates.

Unbundled Network Elements (UNE): CLEC purchases individual unbundled network element(s), e.g., unbundled network element-loop (UNE-Loop), from an ILEC that may be used alone or in combination to provide telecommunication services to CLEC end user customers.

One example of an element type developed by the **NRCM** is a *"POTS/ISDN Migration -UNE-P.* This element type represents the situation where an existing POTS or ISDN customer changes its local service provider from an ILEC to a CLEC, and the CLEC serves the customer by purchasing the unbundled network elements in combination (UNE-P).

Within the model, the user has the ability of either costing individual element types or batch processing a user selected list of element types all at once.

B. Identify and Map Activities:

The **NRCM** identifies the individual systems utilized and manual work activities performed, when an ILEC provides a non-recurring service. These activities are considered generic for the ILEC and fall primarily within the pre-ordering, ordering and provisioning processes. See **Attachment B** for a complete list and description of the activities included in the model.

The model then maps the appropriate set of work activities to each NRC element type. For example, to migrate a POTS customer under the UNE-P option. requires nineteen identified work activities. The logic of the *NRC Model* maps these activities to the NRC element type through an assignment table contained on the "*Process & Calcs*" sheet of the *NRC Model*.

As demonstrated in the following table excerpt, activity assignment is made by the placement of an "X" at the table intersection of activity and NRC element type. (Note: while some activities are generic to many NRC element types, others are specific to only a few.)

ID No.	Process Flow / Activity	1 POTS / ISDN BRI - Migration - TSR	3 POTS / ISDN BRI - Migration - UNE - Platform	49
1	*Pre Order Steps*	X	X	
2	CLEC customer contact	X	X	
3	CLEC requests customer address data, CSR. and appointment from ILEC	X	X	
4	ILEC gateway requests address data from Administrative Information System and CSR	X	X	
5	ILEC gateway formats and returns address. CSR. and appointment data to CLEC			
6	*Ordering Steps*	X	X	
7	CLEC customer service representative inputs LSR information into LOS	X	X	
8	ILEC gateway receives, validates and logs LSR. returns FOC. and passes LSR to SOG	X	X	
9	CLEC gateway sends LSR to EXACT			
10	ILEC SOG retrieves CSR data. formats and passes to SOP	X	X	
11	*Provisioning Processing Steps*	X	X	
12	EXACT and TUF sends request to SOP			
13	SOP sends request to SOAC	X	X	
14	SOAC analyzes order. generates assignment requests for OSP, COE. IOF. etc.	X	X	
....				

When a user of the model chooses to cost out a particular NRC element type, the model selects the column corresponding to that NRC element type and looks for the activities that are required to be performed. If an "X" is shown, the activity in that row is required. In the table shown above, for example, a *POTS Migration* under the TSR connectivity option requires steps 2, 3, 4, 7, 8, 10, 13, and 14. (Note: this is only a sample of activities required for this element type).

For each activity described above, the model incorporates costing inputs. These inputs include the probability of the activity's occurrence, the time to complete the work activity, and the labor rate associated with the work activity. The model then calculates the cost of each individual activity based upon these inputs and model assumptions.

C. Calculate Costs:

The third stage of the model calculates the cost of each activity and process. The **NRCM** uses advanced features of Microsoft Excel 7.0 including Visual Basic for Applications (VBA) macros and dialog boxes. The User Guide, which is a separate document, contains additional information on how to run the model.

Through the use of "drop-down" input screens, the model provides the user with alternative input feeds that impact non-recurring service costs. These input screens include the following:

NRC Model - Control Panel: Prompts the user to select NRC element type and state.

Customize Batch: Allows the user to exclude elements from a Batch Run Scenario.

Manual Labor Rates: Prompts the user to either accept or override default values for the input labor rates.

Other NRC Model Inputs: Prompts the user to either accept or override default input values for the following **NRCM** inputs. (Note: the Assumptions and Inputs of the model are described in more detail later in this document)

- Copper Loop Percentage
- Central Office Staffing Ratio (% of lines served via staffed central offices)
- Average Trip Time
- Average Setup Time
- Work Activities per Order (in central office)
- Percentage Dedicated Facilities
- Variable Overhead (%)
- POTS System Fallout
- Complex System Fallout

After the user has selected an element type, and has accepted or adjusted any of the default inputs, the model selects all of the activities associated with that particular non-recurring element type based upon the assignment table. Once these activities are selected, the model calculates the cost of each activity using the following formula:

Activity Cost = (Activity Probability (%) x Time (minutes)) x Rate ($ per hour) / 60

The chart below demonstrates how the model performs this step:

A	B	C	D = (A x B x C) / 60
Probability	Time	Rate	Cost w/out Overhead
(%)	(minutes)	($/hour)	($)
NA			
100.0%	-	R	$ -
NA			
100.0%	-	R	$ -
40.0%	2.50	36.64	$ 0.61
2.0%	20.00	36.64	$ 0.24
40.0%	0.25	36.64	$ 0.06
40.0%	2.00	36.64	$ 0.49
40.0%	0.25	36.64	$ 0.06
40.0%	1.50	36.64	$ 0.37
2.0%	-	R	$ -
2.0%	2.50	33.87	$ 0.03
2.0%	15.00	33.87	$ 0.17
60.0%	-	R	$ -

As reflected above, an assumption in the model is that **forward looking OSS investments** and system processing costs should be **recovered elsewhere, in competitively neutral recurring rates,** as opposed to non-recurring rates. Therefore, the costs of these activities are set to zero by the placement of an "R" in the *Rate* input field.

Finally, the model sums the costs of all appropriate activities for each element type and then applies the user defined "overhead factor" to arrive at the total cost of providing the element.

D. Generate Results

After all calculations have been completed, the model populates the results into a table. NRC element types that are run individually are output by the model as follows:

NRC #	Alabama - NRC Elements	Total Cost		Total Cost	
1	POTS / ISDN BRI Install (UNE Loop)	S 1.90	← with overhead	S 1.72	← without overhead

When results are run in batch mode, the model outputs the cost of each NRC element type generated by the model in a single table.

2. Variable Input Fields

2.0 General

The element types that were initially selected for calculation by the model were developed based on a review of the charges proposed by ILECs during negotiation and arbitration proceedings. These element types consist primarily of all work activities performed in the delivery of each service to existing customers (migration)[3] and to new customers (installation)[4]. The following details each of the element types included in the NRC Model. Included is a sample NRCM output (Attachment A) and a list of the detailed work activities (Attachment B). Within the model, the user has the ability of either costing individual element types or batch processing all element types at once. It is expected that additional element types will be added to the NRCM in the future, on an as required basis.

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3   Migration is defined as moving existing ILEC customers to a CLEC.

4   Installation is defined as the establishment of service for a CLEC customer that is not currently served by an ILEC. Service may be for an existing or new customer premise.

2.1 Key Drivers of Cost

The following are brief descriptions of the 9 easily adjustable variable inputs to the Model which are the principle drivers of non-recurring costs. They are discussed in more detail within this document.

2.1.1 Variable Inputs

1. **Manual Labor Rates ($ per hour)** - Manual labor rates have been developed by state and company for 14 different job classifications. See Section 4 for labor rate development and for job classification details. When the state selection is made, the model provides an input screen containing the labor rates for that particular state/ILEC. Where there is more than one ILEC in a state, multiple selections are available for that state. This screen can be used to modify the default labor rates contained in the model.

2. **Copper Loop Percentage** - This represents the percent of lines served by copper as opposed to lines served by fiber (i.e., TR-303 Integrated Digital Loop Carrier). The model default is 40% copper. The significance of this variable is that there are additional work steps associated with copper plant. This ratio can be user adjusted.

3. **Central Office Staffed Ratio** - This input variable represents the percent of lines in a state that are served out of central offices which have technicians on site. The significance of this variable is that additional travel time and cost is required in order to do work in those offices that are not normally staffed. For example, service orders may require a technician to be dispatched for work to be completed at a non-staffed office. As the default ratio, the NRC Model assumes that 80% of the lines in a state are served by staffed central offices.

4. **Average Trip Time** - This variable accounts for the travel time of a technician. Technicians may need to periodically make trips to the field to rearrange outside plant, or will need to travel to the non-staffed central offices to complete various work activities such as customer orders, on-going maintenance, etc. The Work Management OSS will schedule and develop the work load and activities for the traveling technicians. Thus, the travel time is associated with several work activities, not just one. The default value contained in the NRC Model for the travel time is 20 minutes.

5. **Setup Time** - This user adjustable variable accounts, as an example, for the time associated with setting up cones while working at the Feeder Distribution Interface (FDI) or the Service Area Interface (SAI). A default value of 10 minutes is used in the Model.

6. **Number of Work Activities Per Setup or Trip** - The default for the number of work activities is dependent on the type of service being modeled. The default selected is the assumption that the technician will complete that number of work activities per trip.

7. **Percentage Dedicated Facilities** - This input represents the percentage of dedicated facilities for POTS type service. A default of 100% is used in the model. As indicated in the model by an "R," any cost associated with dedicated facilities should be recovered via recurring rate elements.

8. **Variable Overhead (10.4%)** - This input represents the loading variable overhead expenses not already captured in the model. The input value of 10.4% is used unless otherwise directed by the Commission.

9. **Fallout** - The model includes, where appropriate, manual processes attributable to "fallout". The default value is 2%. The service center assumed is the highest cost service center that might be involved with the given element type. The time estimated includes the following:
   - pulling and analyzing the order
   - assist in processing the order - resolve jeopardy

Probability: Probability represents an adjustment factor which recognizes the impact of changes in the key drivers of cost. (e.g., an element type involving the loop could be a copper or fiber design). There is a 40%/60% relationship between copper and fiber loops. When a copper design is used, the probability is 40%. Probability is the total adjustment factor applied after taking into consideration all of the variables applicable to a particular activity.

Time: Activity times are based on estimates provided by a panel of Subject Matter Experts.

Work Centers: Work centers and work groups were selected based on the panel of Subject Matter Experts' determination of the most likely center to perform this work.

"Non Cost" Steps:
- Processing Times: Times required by an OSS to process an order electronically.
- "R": These costs are recovered elsewhere in a competitively neutral fashion and are defaulted to '0'.
- "NA": Indicates that the step or activity is not a cost to the ILEC.

STATE SELECTION:

3.0 General

The user is able to choose a state jurisdiction to model. State selection is intended to drive the appropriate labor rates for that particular state. Where there is more than one ILEC in a state, multiple selections are available for that state.

4. MANUAL LABOR RATES ($ PER HOUR)

4.0 General

If the user selects a given state's default labor rates, the model selects that state's specific loaded labor rates. Although most ILECs have supplied the labor rates for their states, some have refused to supply labor contracts for all their states. For those states that the ILECs have not supplied labor contracts, the model uses similar rates as proxies. Those states that required proxy rates have been highlighted in red in the States Input Table. The 1997 contract rates were utilized in the Model.

4.1 Labor Rate Highlights

- **State and Company Specific**: Labor rates are state specific to the extent that appropriate collective agreements (union contracts) were obtained. At the writing of this document, with the exception of Connecticut and Alaska, all RBOC contract rates had been included in the Model.
- **GTE Rates**: GTE rates will be calculated separately as the collective agreements are received. At the writing of this document, only Virginia, Pennsylvania, California, Arkansas, New Mexico, Oklahoma and Texas had been completed for GTE.
- **Loading**: The loading used to build the final rates from the collective agreement rates are the same for every state, GTE and Bell. See the labor rate example for the list of loading
- **Productive Hourly Rates**: The labor rates are inflated by approximately 23% to convert them to productive hourly rates. This accounts for time lost on coffee breaks, illness, vacation, training, holidays, etc. The actual calculation assumes 1685 productive hours annually versus 2080 hours paid. This is based on annual productive hours from other studies and on the subject matter expert's professional opinion.
- **Premium Time**: Premium time is added to account for overtime paid. This equates to approximately 10% overtime and only includes the premium portion of the overtime pay.
- **Miscellaneous Costs**: Miscellaneous costs are added (approximately 7%) to cover expenses such as travel costs to attend training, office supplies, non-capitalized hand tools, telephone concessions, etc. This is based on data from other studies and on the subject matter expert's professional opinion.
- **Supervision**: Supervision is included assuming that each supervisor will have 15 reporting subordinates. Second and third level management costs are included and assume a 5:1 ratio plus one support clerk. Including second and third level management in the craft loading means the labor rate is a "fully assigned" rate.

4.2 Labor Rate Rationale

4.2.1 Establishing Labor Rate

The labor rates are calculated on a forward looking basis. This means that the union contract rates and benefits are specified. Labor costs must be controlled through management of the employee related expenses and minimizing labor costs through technology. Overtime and miscellaneous expenses are manageable and set at a reasonable forward looking level.

Some RBOC cost studies use a directly assigned labor rate which includes only first level supervision. (There are exceptions.) The NRCM uses fully assigned rates because:

1. There are some states that require it and we strive for consistency.
2. TELRIC methodology attempts to bring shared costs closer to the activity causing the costs.

We assume that if there were no NRC activities, the management forces through third level could be reduced, thus we elected to share in their costs.

4.2.2 Job Functions and Descriptions

The job functions and descriptions in the union contracts were mapped to the NRCM functions (shown in the table below) by a team of experts with RBOC experience. (See section 27 for a detailed listing of qualifications for the panel of subject matter experts).

Work Group	NRCM Work Center Description
BDAC (Business Dispatched Administration Center)	(Not currently used in NRCM) The BDAC is responsible for handling business customer-initiated order requests (e.g., changes, new connects, moves, etc.) that can be handled over the telephone.
CDAC (Combine Dispatched Administration Center)	(Not currently used in NRCM) The CDAC is responsible for handling residential customer-initiated order requests (e.g., changes, new connects, moves, etc.) that can be handled over the telephone.
CPC (Circuit Provisioning Center)	The CPC is responsible for the assignment of facilities and equipment and the preparation and distribution of WORD documents for message trunk circuits, special access and other designed special service circuits, and carrier systems (e.g.; Transport Systems – DS1, DS3, SONET, Frame Relay, etc.). The CPC generates those circuit designs not produced by the TIRKS system. The Circuit Transmission Engineering Center (CTEC) provides circuit design assistance to the CPC when requested. CPC also uses the Facility Engineering Planning System (FEPS)
CSC (Customer Service Center)	(Not currently used in NRCM)
FCC (Frame Control Center)	The FCC is responsible for the administrative, force control, work control, and analysis functions associated with the installation and maintenance of crossconnects of the loop to the office equipment (OE) also known as the switch port, and their associated activities in central offices. The center is responsible for providing related order status and work completion information to the support systems, COSMOS/SWITCH system, or to Order or Circuit Control Centers. The centers will also be responsible for the support of facility maintenance, and/or substitution of facilities in connection with failures detected by routine testing or customer complaints.
FMAC (Facilities Maintenance Administration Center)	The FMAC is responsible for the functions associated with the installation and maintenance of HICAP services (e.g., DS1, DS3, SONET OCn, STS-1. Frame Relay, etc.).
SS I&M/OSP (Installation and Maintenance/Outside Plant)	These technicians are responsible for installation and repair of outside plant facilities, including cable, drop, protector, network terminating wire, NID, FDI, and other facilities within the F-2 through F-9 OSP.
LAC (Loop Assignment Center)	Loop Assignment Center is responsible for providing, via manual intervention, facility assignments (Inside & Outside Plant)
NTEC (Network Terminal Equipment Center)	These CO technicians are responsible for DS0 and DS0/Subrate Special Services, administering the upkeep and repair of central office (CO) facilities including, but not limited to SMAS, Toll Frames (MDF), Automated Digital Terminal Systems (i.e., AD4, and D5), D4 Channel Banks. Metallic Facility Terminals (MFT) 1/0 DCS. Tie Pair arrangements, Central Office Terminals (COT), etc.
RCMAC (Recent Change	The RCMAC utilizes with MAS (Memory Administration System, which is a

Work Group	NRCM Work Center Description
Memory Administration Center)	generic name for RMAS or MARCH). These systems provide an automatic flow of recent change information to the local switches.
SCC (Switching Control Center)	This center is responsible for monitoring, surveillance, and maintenance of the switches, and for complex translations such as those used for routing, centrex, etc.
SSC (Special Services Center)	This center is responsible for coordination and testing of DS0, DS0/S, DS1, DS3, Frame Relay, and other special access, special service designed services.
Splicing Technician	These technicians perform copper and/or fiber splicing functions.
ICSC (Interexchange Carrier Service Center)	(Not currently used in NRCM) The role of the ICSC is to serve as the primary point of contact for handling the service needs of all customers served under the access tariffs. Generally, this center is only involved when an access service request does not flow-through the electronic gateways and related systems.

The union contract was used to determine the hourly rate paid for the job functions contained in the NRCM. It should be noted that the NRCM is forward looking in that if an ILEC chooses to have a specific function performed by a higher rated employee than is required, the additional cost is solely their responsibility since it is their work force management decision.

4.2.3 Pay Weight Averaging

AT&T and MCI do not have the necessary information to weight average the pay based on the tenure of the work force nor the disbursement of the work force among the various pay zones. Since we did not have the data that would be required to support a more accurate number and to avoid controversy, the NRCM assumes the entire work force is at the maximum rate of pay for their title and they are all working in the highest pay zone in the state. It should be noted that an accurate/reasonable estimate would be preferable to this conservative approach.

4.2.4 Premium Rate

The premium rate loading contains only the premium portion of the pay, not the basic rate, since a productive hourly rate based on annual hours is used. If the basic rate were added to the loading, then corresponding adjustments to the annual productive hours would be required which would vary by job function. The NRCM employs the simpler method of using only the premium pay which represents approximately 10% overtime for the top craft employee. The 10% figure represents the breakpoint for steady state overtime worked. Any more than 10% results in unacceptable reductions in productivity and should warrant a permanent addition to the work force. In a forward looking environment, this is budgeted and controllable.

4.2.5 Miscellaneous Expenses

Miscellaneous expenses are also budgeted and controllable. Some positions may require more expenses than others. For example, a technician will require miscellaneous hand tools and will travel more than those working in the centers. To estimate these costs individually by Job Function Code (JFC) would be highly speculative. Thus, the average was used.

4.2.6 Pay Rate Calculation

Publicly available cost models (e.g., the non-proprietary state of New York for unbundled network elements and any of the BellSouth states for the non-proprietary unbundled network element cost) suggest that benefits generally equate to approximately a 33%-35% increase over the contract labor rates. The *NRCM* uses a 40% benefits loading to avoid controversy since data was not available to support a more accurate number and that our estimate is, therefore, a ceiling. The first through third level management salaries and benefits were calculated and loaded on to the labor rates based on a ratio of 15:1 for contract to supervisory personnel, and 5:1 for the next two layers of management. The salary and benefits for one clerical position were also incorporated.

The loaded hourly rates were inflated by approximately 23% to represent productive hourly rates. This includes paid time off for vacations, holidays, personal days, training, coffee breaks, etc. Miscellaneous expenses were added to cover such items as travel expense, training, and office supplies. Finally, another increment was added to cover premium pay for overtime worked.

Provided below is an example of the labor rate calculation.

Wage Rate Components	Input	Hourly	Cumulative	Derivation
Basic wage rate		$20.00	$20.00	Union contract
Benefits loading	40%	$8.00	$28.00	Subject matter expert
Non productive time loading	123%	$6.56	$34.56	2080 paid hrs / 1685 prod hrs
Overtime loading		$1.78	$36.34	$3000 annual overtime / 1685 prod hrs
Miscellaneous loading		$1.19	$37.53	$2000 annual misc exp / 1685 prod hrs
First line supervisor salary w/benefits	$75,000			SME estimate
First Level hourly w/benefits	$36.06			Salary & bene / 2080 paid hours
First Level hourly		$2.40	$39.94	1st level sal & bene / 15 reports
Second level mgmt. ave. salary w/benefits	$105,000			SME estimate
Second level hourly w/benefits	$50.48			Salary & bene / 2080 paid hours
Second Level hourly		$0.67	$40.61	2nd level sal & bene / 75 reporting people
Third level ave. salary w/benefits	$135,000			SME estimate
Third level hourly w/benefits	$64.90			Salary & bene / 2080 paid hours
Third level sal. (Hr.) divided by 375		$0.17	$40.78	3rd level sal & bene / 375 reporting people
Support Clerk ave. salary w/benefits	$51,800			SME estimate
Support clerk hourly w/benefits	$24.90			Salary & bene / 2080 paid hours
Support clerk sal. (Hr.) divided by 375		$0.07	$40.85	Support clerk sal & bene / 375 people

5. COPPER LOOP PERCENTAGE

5.0 General

This represents the percent of lines served by copper as opposed to lines served by fiber (i.e., TR-303 IDLC (Integrated Digital Loop Carrier)). The model default is 40% copper, 60% fiber. This value is based on engineering expertise and the TELRIC scorched node approach that represents the copper/fiber ratio that one would expect to see in a forward looking network build. The significance of this variable is that there are additional work steps associated with copper plant.

The Copper Loop Percentage can be user adjusted in increments of 1% via the input box "spinners". The user can also input a value such as 45.1% directly into the spinner boxes.

Copper Loop Percentage   40%

6. CO STAFFING RATIO (% OF LINES SERVED BY STAFFED CENTRAL OFFICES (CO)

6.0 General

This input variable represents the percent of lines in a state that are served out of central offices which have technicians on site (i.e., staffed central office). The significance of this variable is that additional travel time and cost is required in order to do work in those offices that are not normally staffed. For example, service orders may require a technician to be dispatched for work to be completed at a non-staffed office. As the default ratio, the NRC Model assumes that 80% of the lines in a state are served by staffed central offices. The 80% default was determined by the panel of Subject Matter Experts in combination with data request responses received from other ILECs.

The CO Staffing Ratio can be user adjusted in increments of 1% via the input box "spinners". The user can also input a value such as 79.5% directly into the spinner boxes.

CO Staffing Ratio
(Percentage of lines served from   80%
staffed central offices)

7. AVERAGE TRIP TIME (MINUTES)

7.0 General

This variable accounts for the travel time of a technician. These technicians may need to periodically make trips to the field to rearrange outside plant, or will need to travel to the non-staffed central offices to complete various work activities such as customer orders, on-going maintenance, etc. Travel time would normally only be associated with sub-loop unbundling for the purposes of the NRCM. The Work Management OSS will schedule and develop the work load and activities for the traveling technicians. Thus, the travel time is associated with several work activities, not just one (see Figure 7-1 below) The default value contained in the NRC Model for the travel time is 20 minutes.

The Average Trip Time can be user adjusted in increments of 1minute via the input box "spinners". The user can also input a value such as 15.5 minutes directly into the spinner boxes.

Trip Time
in Minutes |20   ▲ ▼

7.1 Assumptions

The Model assumes that for a:

Central Office Technician

- A technician will return to his or her reporting center at the end of the work day.
- A technician will travel, in a metropolitan area, an average of not more than 6 to 10 miles to a non-staffed central office.
- The non-staffed central office has a secure parking lot. Therefore, no setup/tear down time is required.
- All special tools and test sets are existing in the non-staffed central office.
- The central offices are approximately 3 to 5 miles from each other.
- The furthest non-staffed central office is no more than two (2) central offices away from the staffed central office.
- Travel time of 20 minutes was estimated.
- 4 activities would be performed on each central office visit.
- Intra-Office travel or travel between floors within the Central Office, has been averaged at 10 minutes, when such travel is likely.
- Incidental travel time has been included within discrete steps e.g. Pull and Analyze step at 2.5 minutes will include the average time travel for the technician to go from a terminal where work orders are received, to the equipment/frame location. In most instances, technicians will carry more than one work order at a time from the terminal.

Installation/Outside Plant Technician

- A technician will return to his or her reporting center at the end of the work day.
- The SAI (Serving Area Interface) or FDI (Feeder Distribution Interface) for the initial service order is approximately 10 miles from the dispatch garage (where technicians obtain the service orders).
- The technician will perform at least 2 activities per trip to an SAI(s) within a Distribution Area.
- The time to drive to the first SAI and subsequent SAIs was modeled in the NRCM (see Figure 7-1).
- The drop is in place and will accommodate at least 2 customer lines all the way to the NID (Network Interface Device)
- The technician has mechanized access to service orders or other OSS while in the 'field'.
- Travel time of 20 minutes was estimated.
- Subsequent travel to the next SAI/FDI or next location requires additional time to set up and tear down.

7.2 Use of GPS & GIS

In a forward-looking efficient environment, assumptions of Dispatching to the OSP include the use of a Field Access System (FAS) that - in addition to the two activities - allows additional provisioning, repair, and maintenance routines to be downloaded automatically from the WFA/DO system via cellular communications. FAS also provides access to loop and cable pair inventory assignment and inventory OSS systems such as LFACS, and test systems such as MLT and SARTS.

It is important to understand that the RBOC vehicles are assumed to be equipped with a global positioning system (GPS) that can be continuously tracked/monitored as far as location, and overlaid on a geographical information system (GIS) such as Map-Info GIS or similar system. This allows the I&M centers to track the location of the I&M vehicle so that they can download additional provisioning, repair, and maintenance activities to the I&M technicians who are closest to, or within the Distribution Area via the aforementioned WFA and FAS OSS systems. Finally, since poles, conduits, pedestals, remote terminals (DLC), CEVs, etc. can be overlaid from the OSP/FM system to the GIS, it allows Alarm LEDs (via Loopview, Loop Surveillance, and NMA surveillance OSS systems) to appear on the GIS GUI so that again, the dispatch center can pinpoint the location of the failure, and through their GPS, locate the

closest I&M tech, break their load (provisioning orders), and dispatch them via WFA/DO and FAS to repair the network OSP failure. Using this forward-looking OSS architecture - which is generally available today - a technician should never be required during the course of the day to return to the garage.
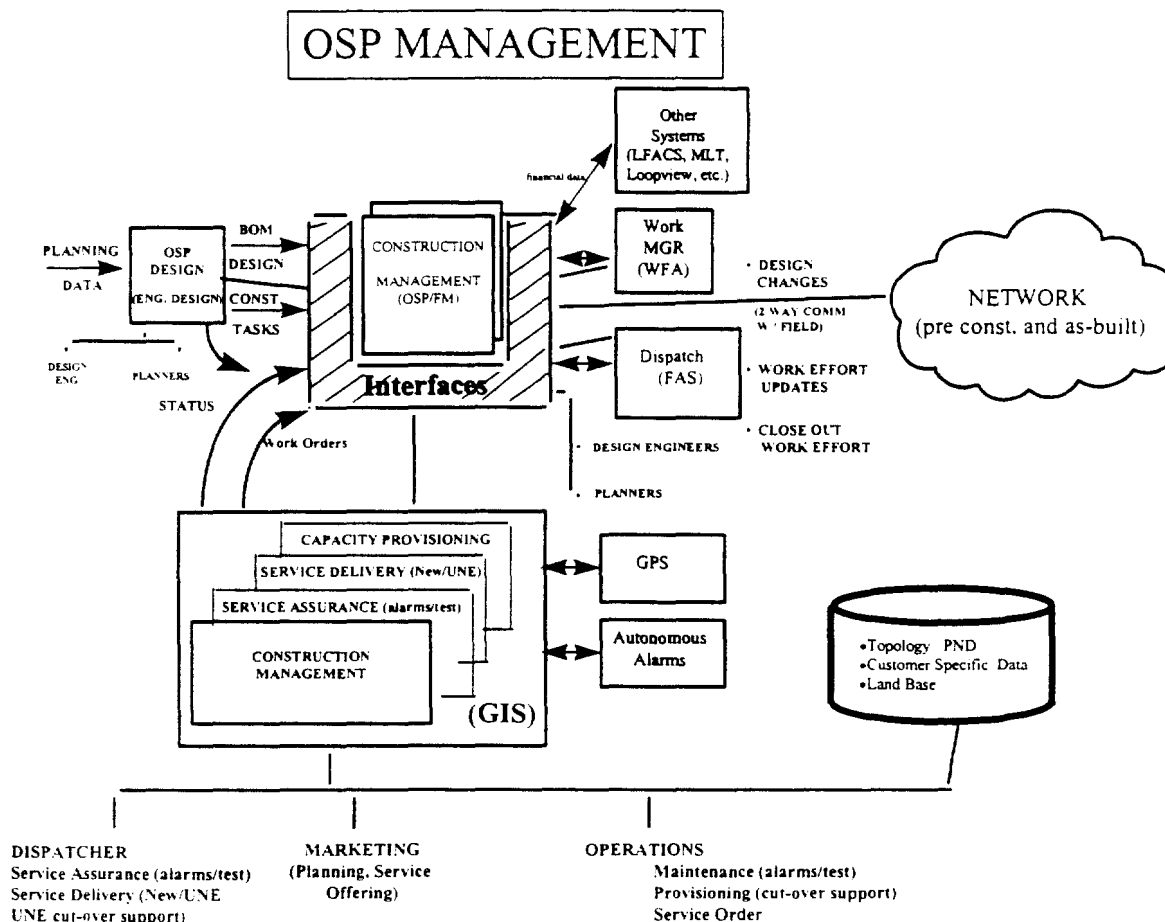
7.3 Reasons for Travel

- As stated earlier, travel is normally only associated with loop unbundling activities (this is non-recurring work.)
- A 'new' access line that was not DOP (see section 18) would be required. Assuming that DOP practices are utilized, a technician will be required to travel to a SAI/FDI only when a manual cross connect is required. This is a cost which is recovered elsewhere.
- To perform a rearrangement or when additional lines are required to a premises where DOP is not established or where service has never been established. These are also costs that are recovered elsewhere.

8. VARIABLE OVERHEAD

8.0 General

This 10.4% input represents the loading variable overhead expenses not already captured in the Model (e.g., Management above Level III, Human Resources, etc.). Unless otherwise directed by a State Commission ruling, the default is 10.4%. The 10.4% default estimated was provided by the Hatfield Model developers and is based on analysis of reported ILEC data.

This ratio can be adjusted in increments of 0.1%.

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Variable
Overhead [%]    10.4%    ▲
                         ▼
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9. FALLOUT

9.0 General

Fallout can best be defined as local orders that were designed to flow through automated OSSs and activate Intelligent Network Elements, but fail to do so.

This model assumes a 98% flow-through (i.e., a 2% fallout rate) for ordering and provisioning (SWBT transcripts for EASE (Easy Access Sales Environment) UNE-P / TSR and UNE flow through provisioning have determined 99% to be the operating level). This model has used fallout rates that can be expected in a forward-looking, competitive telecommunications environment.

Two percent fallout can be achieved with Legacy OSS when there is a will to optimize all of a system's capabilities and implementation of effective and sustained system management processes.

We have cited data in SWBT where both simple and complex orders were discussed in the pre-hearing session. SWBT representatives did indicate that there were orders that would always require manual attention due to their uniqueness and complexity. On an average day, SWBT would process 65,000 orders and on a busy day 103,000 with a 99% flow through. On an average day, 1300 orders would be processed manually. The figure 2% for fallout was set for both POTS and complex orders. This level is based on citing in SWBT as well as consideration for the basic qualities of an efficient flow through process.

As an example of what might cause fallout, assume, as is the case with the ILEC Legacy OSS platform, that several OSS are electronically linked to create a flow-through electronic provisioning process. If one of the OSS receive erroneous or incompatible information from another OSS, the order will fallout of the electronic process and will require manual intervention to correct or complete the order. [5] However,

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[5] Consistent with the assumption mentioned above that efficient companies employ system administration practices that include database synchronization and system release administration procedures, it is important to note that it would be inappropriate to allow the ILECs to pass along costs to CLECs for all cases in which fallout is caused by erroneous or incompatible information. To a significant degree the quality of a service order issued by a CLEC will be driven by the quality of information that the CLEC obtains from the ILEC. For example, most of the information on a CLEC order to convert an existing customer will be obtained in the pre-ordering directly from the ILEC's database. If the ILEC provides incorrect or un-synchronized data to the CLEC during the pre-ordering phase, the CLEC should not be accountable for any subsequent fallout caused by that incorrect data.

fallout is not simply a manual process, *per se*. Fallout can be resolved via electronic means which streamline and eliminate many of the manual steps now required to manage exceptions or fallout. The PAWS system (Provisioning Activity Work Station) is one such OSS which works in a provisioning flow through environment, communicating easily with service request controllers and other operations systems. We recognize that systems are evolving to assist in resolving fallout, (e.g., PAWS) and would expect greater improvements in this area in the future.

ILECs are utilizing network and OSS technology assumptions and cost history which are not forward looking as directed by the FCC. Typically, assumptions by ILECs lead to fallout and the need for costly manual intervention to permit service orders to continue towards completion. This will lead to cost outputs which will not support competitive pricing and a competitive marketplace for customers.

We are at the turning point for major efficiency changes in the OSS as a result of new database architectures and process communication links. The TMN architecture is taking hold and will deliver further performance improvements that are necessary in a competitive environment. As stated in GR 2869 CORE,.. "Telecommunications service providers are facing increased competition for market share. To be competitive and provide quality service they need high-quality operations capabilities to support their service offerings and they need to design their operations architecture to be efficient, cost effective and rapidly deployable."

Once the electronic interfaces to the system components throughout the processes are in place, and the new entrant's personnel have the same (parity) access, read/write as required, as the ILEC attendants, fallout levels of 1-2% are reasonable. The only real impediments to this, beyond poorly managed ILEC databases, is the placement of ineffective interfaces and the use of network elements that are not forward looking and capable of intelligent communications with network OSS. Database maintenance is clearly a shareholder expense that has not been undertaken as it should have been. All databases should be maintained current and synchronized at all times as a matter of good business. Not paying to maintain these databases is a decision resulting from expense funding availability in past years. ILECs should not be allowed to use costs in their models, that reflect embedded technology, and inefficient operational systems and processes (high levels of fallout are synonymous with inefficient systems and processes). The impediments should not drive costs to new entrants. Moreover, the primary means to ensure that the ILECs do not purposely deploy such inefficiencies to create service quality barriers to entry is to ensure that the ILECs bear the costs of all inefficient processes that it does maintain.

Instead, the ILECs should build and pay for this work, and should demonstrate excellent performance to ensure that effective interfaces are constructed. Otherwise, there is no motivation to have a least cost and effective interface in place.

FALLOUT CAUSES

There are four major categories of electronic flow-through provisioning fallout.
1) Database synchronization errors
2) Network element denial
3) Communication errors
4) Synchronization errors

There are also 5 other possible OSS related problems that can cause provisioning fallout.
1) New software release incompatibility (OSS/OSS or OSS/INE).
2) Hardware platform failures
3) Operating System failures.
4) User application layer failures.
5) Other (held orders, network exhaustion, etc. - related to element denial)

Database synchronization errors occur when databases that contain identical data do not match, or they disagree as to the availability or status of a needed resource. Typical database synchronization errors that fallout include street names that exist in one database that are not duplicated in other databases. Another example is when facilities marked as 'spare' (i.e., available for assignment) in one database are not reflected as available in another database.

Network element denial is a second type of fallout. It can happen when an Intelligent Network Element (INE), such as a Local Digital Switch, responds that it cannot perform a task requested by another component of the network for whatever reason. For example, the Element
Management System might believe that a certain version of software is available to activate certain features, when in reality the installation of this software has not yet been completed.

Communication errors represent the failure of the communications links between OSS, the Element Management Systems (EMS), and/or the INE. These errors take place because a valid communication path cannot be found between the elements.

Synchronization errors occur when two separate components (OSS to OSS or OSS to EMS & INE) attempt to communicate, but fail to establish the necessary communications protocols, even though the link is functioning.

New software release incompatibility is where a software release residing on an OSS or network element is not compatible with the software residing on another OSS(s) or network element(s).

Hardware platform failures are where the OSS operating hardware, (workstation, mini-computer, mainframe) experiences an equipment failure that prevents all or part of the operations to be performed in an automated flow through manner.

Operating System and Applications level failure are failures related to the software residing on the hardware that prevents all or part of the operations from being performed in an automated flow-through matter.

Of the nine categories of fallout, the error that occurs most often is database synchronization error. Thus the degree of fallout from these four categories can and should be minimized by properly maintaining the OSS databases and the telecommunications network.

In determining the input values for fallout, in both a simple (POTS) and complex environment, the **NRCM** draws upon industry experience and comparable industry information[6]. Relying on the assumption of efficiently operated OSS and processes, the default fallout rate utilized in the **NRCM** is 2%. This is further supported in Bellcore GR-2869, where according to Section 4.6.2 (Immediate Service Activation) "Activation will occur at the time of assignment" (i.e., immediately)[7]. OSS processes that allow for direct or immediate activation can significantly
reduce fallout because the service order generator learns immediately if an order cannot be made effective. Thereby, the order generator has the opportunity to obtain additional information and ensure that the order can be processed within the context of the original customer contact.

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[6] Southwestern Bell recently indicated in its Texas filing that their EASE system, which services residential lines, has a fallout rate of 1% (transcripts: Open Meeting Pre-hearing Conference- 6/24/97- Southwestern Bell before the P.U.C. and A.L.J.) In addition, US West states in a cost study filed before the Minnesota Public Service Commission on 7/11/97 that "97% of all CSB PIC Changes are completely mechanized."

[7] Bellcore GR-2869, Issue 2, (Oct.1996) pg. 4-25, section 4.6.2

There are ILECs that have systems and processes that deliver services built with unbundled network elements, and their fallout levels are approaching, at, or better than, what our model proposes for certain service delivery. Also, the ILEC is proposing to deliver similar performance for other end to end service delivery. (e.g., SWBT transcripts for EASE/ TSR and UNE flow through provisioning. This system is for residential and business applications. The new entrants service representative has command of the same legacy systems as SWBT. This system typically handles 65,000-103,000 orders per day with 1% of the orders falling out of the system. SWBT has indicated that its expectation for this electronic solution for the new entrants will also have a 1% fallout. If the order falls out of the system the new entrant has the ability to correct the problem). (HELPDESK assistance will be available from the ILEC on an as required basis)

Once the electronic interfaces to the system components throughout the processes are in place, and the new entrant's personnel have the same (parity) access, read write as required, as the ILEC attendants, fallout levels of 1-2% are reasonable. The only real impediments to this, beyond poorly managed ILEC databases, are the placement of ineffective interfaces and the use of network elements that are not forward looking and capable of intelligent communications with network OSS. These impediments should not be at the expense of the new entrants.

To ensure that effective interfaces are constructed, the ILEC should build and pay for this work, and should demonstrate excellent performance. Otherwise, there is no motivation to have a least cost and effective interface in place.

The deteriorated databases are clearly a shareholder expense that has not been undertaken as it should have been. All databases should be maintained current and synchronized at all times as a matter of good business. Not paying to maintain these databases is a decision resulting from expense funding availability in past years.

This variable is user adjustable for both POTS and complex fallout.